**Person A: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Round 1 – Sinusoidal Models** **As you ride the Ferris wheel, your distance from the ground varies sinusoidally with time. You are the last seat filled and the Ferris wheel starts immediately. Let t be the number of seconds that have elapsed since the Ferris wheel started. You find that it takes you 3s to reach the top, 43ft above the ground, and that the wheel makes a revolution every 6s. The diameter of the Ferris wheel is 40ft.** **Write an equation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 2 – Sinusoidal Models****Using the information in round 1, answer the following.****Predict your height above the ground at 7s.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Round 3- Sinusoidal Model****A rodeo performer spins a lasso in a circle perpendicular to the ground. The height of the knot in feet from the ground is modeled by** **h = 5 sin (3t)+ 6****What is the highest point reached by the knot?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 4-Sinusoidal Model****Using the information from round 3, answer the following****What is the lowest point reached by the knot?\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Round 5-Logistic model****The spread of a disease through a community can be modeled with the logistic equation** $ y=\frac{600}{1+59e^{-0.1t}}$ **.** **How many people are infected on the 25th day. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  | **Round 6-Logistic Model****Using the information from round 4, answer the following.****How many days does is take the entire population to be infected?\_\_\_\_\_\_\_\_\_****What is the limiting factor?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Round 7- Step Functions****Given the following step function, answer the following.****A web page designer has posted the following pay scale for designing websites.** **How much would it cost to design a website that takes 4 hours?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 8- Step Functions****A shipping company charges $3.50 to ship a package weighing one pound or less. Then they charge $1.50 for each additional pound, or fraction of a pound, up to five pounds.** **What will it cost to ship a package that weighs 5 pounds?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

**Person B: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Round 1 – Sinusoidal Models** **As you ride the Ferris wheel, your distance from the ground varies sinusoidally with time. You are the last seat filled and the Ferris wheel starts immediately. Let t be the number of seconds that have elapsed since the Ferris wheel started. You find that it takes you 3s to reach the top, 43ft above the ground, and that the wheel makes a revolution every 6s. The diameter of the Ferris wheel is 40ft.** **Write an equation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 2 – Sinusoidal Models****Using the information in round 1, answer the following.****What is the value of t the second time you are 18ft above the ground?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  |
| **Round 3-Sinusoidal Model** **A rodeo performer spins a lasso in a circle perpendicular to the ground. The height of the knot in feet from the ground is modeled by** **h = 2 sin (2t) + 3****What is the highest point reached by the knot?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 4- Sinusoidal Model****Using the information from round 3, answer the following****What is the lowest point reached by the knot?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Round 5-Logistic model****The spread of a disease through a community can be modeled with the logistic equation** $ y=\frac{500}{1+49e^{-0.1t}}$ **.** **How many people are infected on the 25th day. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  | **Round 6-Logistic Model****Using the information from round 5, answer the following.****How many days does is take the entire population to be infected?\_\_\_\_\_\_\_\_\_\_\_\_\_****What is the limiting factor?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Round 7- Step Functions****Given the following step function, answer the following.****A web page designer has posted the following pay scale for designing websites.** **How much would it cost to design a website that takes 2.5 hours?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 8- Step Functions****A shipping company charges $3.50 to ship a package weighing one pound or less. Then they charge $1.50 for each additional pound, or fraction of a pound, up to five pounds.** **What will it cost to ship a package that weighs 1.5 pounds?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

**Person C: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Round 1 -Sinusoidal Models****Mark Twain sat on the deck of a river steamboat. As the paddlewheel turned, he noticed a dead fish caught on one of the paddles. As the wheel turned, the distance, d, that the fish was from the water’s surface was a sinusoidal function of time. When his stopwatch read 4 seconds, the fish was at its highest, 16 feet above the water’s surface. It took another 10 seconds before the fish reached that height again. The diameter of the wheel was 18 feet.** **Write an equation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 2-Sinusoidal Models****Using the information in round 1, answer the following.****Predict the fish’s height above the water at 2 seconds.\_\_\_\_\_\_\_\_\_\_** |
| **Round 3-Sinusoidal Model****A rodeo performer spins a lasso in a circle perpendicular to the ground. The height of the knot in feet from the ground is modeled by** **h = 4 sin (3t) + 5****What is the highest point reached by the knot?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 4-Sinusoidal Model****Using the information in round 3, answer the following.****What is the lowest point reached by the knot?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Round 5- Logistic model****The spread of a disease through a community can be modeled with the logistic equation** $ y=\frac{400}{1+39e^{-0.1t}}$ **.** **How many people are infected on the 25th day. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  | **Round 6-Logistic Model****Using the information in round 5, answer the following.****How many days does is take the entire population to be infected?\_\_\_\_\_\_\_\_\_\_\_\_\_****What is the limiting factor?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Round 7- Step Functions****Given the following step function, answer the following.****A web page designer has posted the following pay scale for designing websites.** **How much would it cost to design a website that takes 6 hours?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 8- Step Functions****A shipping company charges $3.50 to ship a package weighing one pound or less. Then they charge $1.50 for each additional pound, or fraction of a pound, up to five pounds.** **What will it cost to ship a package that weighs 3 pounds?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

**Person D: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Round 1-Sinusoidal Models****Mark Twain sat on the deck of a river steamboat. As the paddlewheel turned, he noticed a dead fish caught on one of the paddles. As the wheel turned, the distance, d, that the fish was from the water’s surface was a sinusoidal function of time. When his stopwatch read 4 seconds, the fish was at its highest, 16 feet above the water’s surface. It took another 10 seconds before the fish reached that height again. The diameter of the wheel was 18 feet.** **Write an equation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 2- Sinusoidal Model****Using the information from round 1, answer the following****What is the height of the dead fish when Mark Twain started his stopwatch?****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Round 3-Sinusoidal Model** **A rodeo performer spins a lasso in a circle perpendicular to the ground. The height of the knot in feet from the ground is modeled by** **h = 3 sin (4t) + 4****What is the highest point reached by the knot?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 4- Sinusoidal Model****Using the information in round 3, answer the following.****What is the lowest point reached by the knot?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Round 5-Logistic model****The spread of a disease through a community can be modeled with the logistic equation** $ y=\frac{300}{1+29e^{-0.1t}}$ **.** **How many people are infected on the 25th day. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  | **Round 6-Logistic Model****Using the information in round 5, answer the following.****How many days does is take the entire population to be infected?\_\_\_\_\_\_\_\_\_\_\_****What is the limiting factor?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Round 7- Step Functions****Given the following step function, answer the following.****A web page designer has posted the following pay scale for designing websites.** **How much would it cost to design a website that takes 5.5 hours?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Round 8- Step Functions****A shipping company charges $3.50 to ship a package weighing one pound or less. Then they charge $1.50 for each additional pound, or fraction of a pound, up to five pounds.** **What will it cost to ship a package that weighs 2.3 pounds?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |